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(54) A METHOD OF OPERATING A TICKETING SYSTEM

EIN VERFAHREN ZUM BETREIBEN EINES FAHRKARTENAUSGABESYSTEMS

PROCEDE D'EXPLOITATION D'UN SYSTEME D'EMISSION ET CONTROLE DE BILLETS

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Description

[0001] The invention relates to a method of operating a ticketing system. In particular but not exclusively the invention relates to a method of operating a ticketing system for a transport service.

[0002] Ticketing and check-in procedures of public transport providers are on the whole, implemented with paper documentation. Using the example of an airline journey, a passenger either through a travel agent or the airline books and pays for a journey and is issued with a paper ticket and/or boarding pass as proof of carriage. The ticket/boarding pass contains information identifying the passenger and the journey. The information on the ticket/boarding pass is verified at the airport by an airline employee before the passenger is allowed to board the flight. Commonly, an airline employee using a computer, which is connected to a database on which the passenger's reservation details are stored, manually verifies the information on the ticket/boarding pass. There are several problems with this process. For instance, manual verification can be slow and hence inconvenient to the passenger. Furthermore, the process relies on pre-printed paper tickets, which are tedious to deal with, and prone to being lost.

[0003] Some effort has been made to automate the check-in procedure at airports. For instance, some airlines now issue tickets or boarding passes, which have ticket information, stored on a magnetic swipe strip. This information is verified at the airport pre-boarding by swiping the card through a swipe reader, which automatically reads the information on the strip. Whereas, the use of swipe strips and swipe readers does speed up the check-in process it is not without its disadvantages. In particular, swipe card readers and also the printers needed to print the ticket/boarding pass with the necessary swipe stripe are expensive to install and cumbersome to use.

[0004] The present invention aims to alleviate these problems.

[0005] EP-A-0 950 968 discloses a method of operating a ticketing system for users, the method comprising: generating data which represents ticket information to allow said ticket data to be used by a user of the system; and transmitting said ticket data such that said data is received by a mobile station over a mobile communications network link. The mobile station is able to receive ticketing data by wireless communication. The mobile station additionally comprises infra red transmission and receiver means. When a ticket carried by the mobile station is to be used, the ticket data is transmitted to a verification device by infra red transmission. The verification device transmits interrogatories to the mobile station by infra red transmission and following a back and forth flow of information, the ticket is either accepted or refused.

[0006] The invention provides a method of operating a ticketing system for users, according to claim 1.

[0007] The above and further features of the invention are set forth with particularity in the appended claims and

together with advantages thereof will become clearer from consideration of the following detailed description of exemplary embodiments of the invention given with reference to the accompanying drawings.

[0008] In the drawings:

Figure 1 is a block diagram schematically illustrating a system embodying the invention.

Figure 2 is a block diagram schematically illustrating a telecommunications mobile station.

Figure 3 is a flow diagram illustrating a procedure carried out in an embodiment of the present invention.

Figure 4 is a flow diagram illustrating another procedure carried out in an embodiment of the present invention.

Figure 5a is a diagram of a bar-code.

Figure 5b is a diagram of a 2-D dot-code.

Figure 6 is an illustration of a mobile station display screen.

Figure 1 is a schematic diagram of a system embodying the invention. For the purposes of illustration only, the embodiment is described with reference to an airline ticketing system.

[0009] A flight reservation centre 1 is connected to an airline computer system 2 and also to a message generator 3. Ticket details of a booking made for a passenger at the reservation centre 1 are stored on the computer system 2. Furthermore, a message containing the ticket details is generated by the message generator 3 and sent over communications link 4 to a mobile station 5 of a passenger. The mobile station 5 has a display screen (not illustrated) and is arranged to present the ticket details as an optical code, for example a bar-code on the screen, for scanning at the airport by an optical code reader 6 as part of the check-in procedure. The optical code reader 6 is connected to the computer system 2 and validates the ticket details read from the mobile station 5 by comparing the details with those stored on the computer system 2. If validation is successful the passenger is authorised to continue the journey.

[0010] The system will now be described in more detail.

[0011] A passenger wishing to reserve a flight does so by contacting the reservation centre 1. Typically, the flight reservation centre 1 is the booking centre of a particular airline or private company (e.g. a travel agency) acting for an airline. Reservations can be made in any number of standard ways, for example by attending the reservation centre 1 in person, by mail, by phone or over the Internet.

[0012] When a flight reservation is made, the reservation centre 1 creates a computer record containing the relevant booking details. For example, this record may comprise some or all the following information:

Customer name

Flight number
Departure airport and terminal
Departure time
Gate number
Seat allocation number
Destination airport/city
Arrival time.

[0013] The reservation centre 1 also creates for each booking a unique identification code commonly known in the airline industry as a Passenger Name Record (PNR) which can be used to identify and retrieve the computer record of the booking. As is known in the art each PNR is coded as a unique set of six alphanumeric characters for example, TQR 8LR.

[0014] Previously, in known booking systems, the PNR has been printed on the paper tickets or boarding passes issued to a passenger by the airline. As part of the check-in or boarding procedure at the airport, the PNR shown on the ticket or boarding pass is entered into the airline computer reservation system which then retrieves the computer record of the booking details associated with the PNR. The information from the computer record can then be checked against that shown on the ticket before the passenger is authorised to continue with the journey.

[0015] In this embodiment of the invention, rather than printing the PNR code onto a ticket or boarding pass with which a passenger is then issued the PNR code is sent direct to a mobile station 5 associated with the passenger. As will be described in more detail below the mobile station holding the PNR code can be used as an electronic ticket apparatus for the check-in and boarding procedures at the airport thereby negating the need for paper tickets.

[0016] Once created, the PNR relating to a booking and also the associated booking details are stored on the airline computer system 2. In addition to this, the PNR and preferably some or all of the associated booking details are sent to message generating unit 3 for transmission over the communications network 4 to the mobile station 5. For illustration purposes only the communications network 4 illustrated in Figure 1 is a GSM (Global System for Mobile Communications) digital cellular radio network. To transmit the PNR code and the booking details to the mobile station 5 the short message service (SMS) data transfer mechanism is employed. The SMS data transfer mechanism is a data transfer teleservice defined in, inter alia, GSM Technical Specification 03.40.

[0017] The generating unit 3, preferably a suitably programmed computer system, is used to generate a correctly formatted SMS message including the PNR and any of the above mentioned booking details that are to be sent to the passenger with the PNR. The SMS message also comprises a header, or flag, which identifies the message as one, which contains booking or ticket information. Once generated the SMS message is sent over the communications network 4 to the destination address of the mobile station 5 of the passenger, the

relevant mobile telephone number of the passenger having been provided to the reservation centre 1 at the time of the booking. The SMS message can be sent to the passenger at any time between the time of booking and the beginning of the check-in procedure at the airport. It is envisaged that the passenger will be able to contact the SMS generating means 3 and request that the message is sent at a time convenient to the passenger.

[0018] Referring to Figure 2 of the accompanying drawings there is shown in more detail the mobile station 5 to which the SMS message is sent and which is arranged to process the message. Only those components of the mobile station 5 necessary to describe the invention are illustrated

[0019] The mobile station 5 comprises a receive/transmit aerial 6, a processor circuit 7 for controlling the operation of the station 5, a memory 8 for storing data, a display 9 capable of displaying bit map images and an input device (keypad) 10.

[0020] The mobile station 5 is provided with a SIM 11 (Subscriber Identity Module). SIMs which contain the International Mobile Subscriber Identity (IMSI) and other such user information are well known in the art. The SIM 11 is further provided with a stored application program (e.g. a SIM application tool kit program) for processing SMS messages which contain ticket information, and controlling the displaying of such messages by the mobile station 5.

[0021] Figure 3 illustrates a procedure carried out by the phone under the control of the application programme when receiving an SMS message containing ticket information. After the phone receives the SMS message the phone checks using the flag in the SMS message that the SMS message contains booking information, step 22. If the SMS message does contain booking information the message is stored in a special directory reserved for booking messages, which may be located either in the phone memory 8 or in memory provided on the SIM 11, step 23. Normal SMS messages not containing ticket information are stored in a normal SMS directory, step 24. Figure 4 illustrates a procedure by which the PNR code contained in the SMS message may be converted into an optical code format, for example a bar-code and displayed for verification on the mobile station's display 9. First, the passenger is prompted, for example by a particular icon on the display 9 of the mobile station 5 which indicates that an SMS ticket message is ready to be displayed, step 31.

[0022] The application programme is arranged to instruct the mobile phone to provide a selectable menu option including a display ticket information option step, 33 with which the passenger can request via the keypad 10 that the PNR code be displayed.

[0023] In response to this selection the application programme causes the PNR code to be retrieved from storage, step 33 and then converted, from the text format in which it is received by the mobile station 5 into a bit map bar-code format, step 34. Once the PNR code is convert-

ed into bar-code format the application programme commands the phone to display the optical code on the display screen 10, step 35. Referring back to figure 1, when the passenger wishes to check-in for or board a flight the PNR code is displayed as a bar-code on the mobile station's display thereby allowing a checking agent at the airport to perform the check-in procedure by scanning the bar-code with bar-code reader 6. Bar-code readers are known in the art and have the advantage of being reliable and relatively easy to use. The bar-code reader 6 is connected to the airline reservation computer 2 and if the PNR code read by the reader 6 is checked successfully against the relevant reservation details stored on the airline computer system 2 the passenger is allowed to continue the journey.

[0024] It can thus be seen that the check-in/boarding procedure is simplified, made quicker and generally more convenient both for the passenger and the airline. The need for the airline to issue paper documentation is reduced and conveniently all the ticket information required for the passenger to make the journey is held on the passenger's mobile station. In effect the mobile station acts as an electronic ticket device which provides proof of carriage for the passenger.

[0025] Two suitable optical code formats into which the PNR can be converted for display are illustrated in Figure 5. Each of these optical codes has a presentation format which is specially adapted for reading by a machine (whereas other presentation formats, such as text, are not specially adapted in said manner). In Figure 5a the optical code 40 is a standard bar-code. Such bar-codes can represent around 40 characters which is more than sufficient to be able to represent a 6 character PNR code. In Figure 5b the optical code 41 is a 2-D dot-code. Such 2-D dot-codes are able to represent up to 2000 characters. Therefore, in addition to the PNR, the application programme may be arranged to encode in the optical code other ticket information contained in the original SMS message. In principle, all of the ticket information listed on page 4 may be included in the message and encoded for display in a 2-D dot-code such as the one illustrated in Figure 5b.

[0026] Advantageously, the original SMS message may also include a hidden security code for encoding into the optical code to render counterfeiting of PNR optical codes more difficult.

[0027] Mobile phones having screen displays capable of displaying optical codes as bit map images with high enough resolution for reliable scanning are known, for instance, the Nokia 7110 which has a monochrome screen with a resolution of 96*65 pixels.

[0028] In addition to converting the PNR code into optical code format and commanding the mobile station to display the optical code, the application programme may also perform other processes with the PNR code or any other booking information received in the SMS message. For instance, referring to figure 6 of the drawings, the application programme may be arranged to command

the phone 50 to display on the screen 51 the PNR code in text format 52 as well as in bar-code format 53. Displaying the PNR in text format allows a checking agent to manually check the PNR in instances where the automatic reading of the optical code fails.

[0029] Furthermore, the programme may be arranged to command the phone 50 to display as text any other booking information contained in the SMS message, for instance, the passenger's reserved seat number or the relevant flight number. As an example, the mobile station illustrated in Figure 6 in addition to being instructed to display the PNR code in bar-code format 53 and the PNR in text format 52, the station has also been instructed to display in text the seat number 54 that has been allocated to the passenger.

[0030] It will be appreciated that the invention is not limited to embodiments in which the ticket information is sent to the mobile station as a text message using SMS. The message may also be sent in other message formats, for instance as a pager message.

[0031] In the above-described embodiments the ticket information is displayed as a bar code or a dot-code. However, it is envisaged that alternative machine-readable formats in which the information may be displayed will be apparent to the skilled person.

[0032] Finally, although the invention has been described in detail with respect to a ticketing system for a transport service, it will be appreciated that the invention may also be used in respect of other activities that require ticket based authorisation, for example attending the theatre or attending sporting events.

[0033] Having thus described the present invention by reference to preferred embodiments, it is to be well understood that the embodiments in question are exemplary only and that modifications and variations such as will occur to those possessed of appropriate knowledge and skills may be made without departure from the scope of the invention as set forth in the appended claims.

Claims

1. A method of operating a ticketing system for users, the method comprising:

generating ticket data which represents ticket information to allow said ticket data to be used by a user of the system (1, 2, 3); and transmitting said ticket data such that said ticket data is received by a mobile station (5) over a mobile communications network link (4); **characterised by** receiving said ticket data from said mobile station (5) by reading said ticket data (53) from a display (9) on the mobile station (5) using an optical reader apparatus (6); and using said ticket data read by said optical reader apparatus (6) in verifying a transaction with said

user;

wherein the ticket data is transmitted to said mobile station (5) in a text message format comprising said ticket data and further information, and the further information (54) is displayed for reading by the user.

2. A method according to claim 1, further comprising storing system data in said system (2) corresponding to said ticket data, and subsequently accessing said system data (2) when said ticket data is received from said mobile station (5) via said optical reader apparatus (6).
3. A method according to claim 1 or 2, wherein the text message format further includes a header which indicates that the text message contains booking or ticket information.
4. A method according to claim 3, wherein the mobile station (5) checks (22) whether the header indicates that the text message contains booking or ticket information and if so, stores (23) the text message in a booking message directory distinct from a normal message directory.
5. A method according to any preceding claim, wherein the text message is an SMS message.
6. A method according to any preceding claim, wherein the optical reader apparatus (6) is a bar-code or pin code reader.
7. A method according to any preceding claim, further comprising:

storing the ticket after generation in a storage device accessible via said mobile communications network (4); and transmitting the ticket data over the mobile communications network link (4) on request.
8. A method according to claim 7, wherein the ticket data is transmitted to the user at a time requested by the user.
9. A method according to any of claims 1 to 6, comprising transmitting the ticket data over the mobile communications network link (4) without request.
10. A method according to any preceding claim, wherein the ticket data is transmitted to said mobile station (5) in one presentation format; and received by said optical reader apparatus (6) in a second different presentation format.
11. A method according to any preceding claim, wherein the ticket information relates to a transport service.

12. A method according to claim 11, wherein the ticket data is received from said mobile station (5) via said optical reader apparatus (6) at a location at which access to a transport service is provided.

13. A method according to claim 12, wherein said ticket data comprises electronic ticket information and check-in at an airport comprises said step of reading said ticket data from the display (9) on the mobile station (5) using the optical reader apparatus (6).

14. A method according to claim 12, wherein said ticket data defines a boarding pass for an aircraft flight.

15. A method according to claim 14, wherein said further information includes a seat number (54) for the user on the aircraft flight.

Patentansprüche

1. Verfahren für das Betreiben eines Ticketverkaufssystems für Benutzer, das Folgendes umfasst:

Erzeugen von Ticketdaten, die Ticketinformationen darstellen, damit die Ticketdaten von einem Benutzer des Systems (1, 2, 3) benutzt werden können, und Übertragen der Ticketdaten, so dass sie über eine Mobilkommunikationsnetzverbindung (4) von einer Mobilstation (5) empfangen werden, **gekennzeichnet durch** das Empfangen der Ticketdaten von der Mobilstation (5) durch Lesen der Ticketdaten (53) von einem Display (9) an der Mobilstation (5) mithilfe einer optischen Lesevorrichtung (6) und das Verwenden der von der optischen Lesevorrichtung (6) gelesenen Ticketdaten beim Verifizieren einer Transaktion für den Benutzer,

wobei die Ticketdaten im Format einer Textnachricht, die die Ticketdaten und weitere Informationen umfasst, zu der Mobilstation (5) übertragen und die weiteren Informationen (54) angezeigt werden, so dass der Benutzer sie lesen kann.

2. Verfahren nach Anspruch 1, das des Weiteren das Speichern von den Ticketdaten entsprechenden Systemdaten in dem System (2) und, wenn die Ticketdaten von der Mobilstation (5) empfangen worden sind, das darauf folgende Zugreifen auf die Systemdaten (2) über die optische Lesevorrichtung (6) umfasst.
3. Verfahren nach Anspruch 1 oder 2, bei dem das Textnachrichtenformat des Weiteren einen Nachrichtenkopf aufweist, der angibt, dass die Textnachricht Buchungs- oder Ticketinformationen enthält.

4. Verfahren nach Anspruch 3, bei dem die Mobilstation (5) überprüft (22), ob der Nachrichtenkopf angibt, dass die Textnachricht Buchungs- oder Ticketinformationen enthält, und wenn dies der Fall ist, die Textnachricht in einem Buchungsnachrichtenverzeichnis speichert (23), das sich von einem normalen Nachrichtenverzeichnis unterscheidet. 5
5. Verfahren nach einem der vorhergehenden Ansprüche, bei dem es sich bei der Textnachricht um eine SMS-Nachricht handelt. 10
6. Verfahren nach einem der vorhergehenden Ansprüche, bei dem es sich bei der optischen Lesevorrichtung (6) um ein Strichcode- oder PIN-Code-Lesegerät handelt. 15
7. Verfahren nach einem der vorhergehenden Ansprüche, das des Weiteren Folgendes umfasst: das Speichern des Tickets nach dem Erstellen in einer Speichereinrichtung, auf die über das Mobilkommunikationsnetz (4) zugegriffen werden kann, und das Übertragen der Ticketdaten über die Mobilkommunikationsnetzverbindung (4) auf Anfrage. 20
8. Verfahren nach Anspruch 7, bei dem die Ticketdaten zu einer von dem Benutzer gewünschten Zeit zu dem Benutzer übertragen werden. 25
9. Verfahren nach einem der Ansprüche 1 bis 6, das das Übertragen der Ticketdaten über die Mobilkommunikationsnetzverbindung (4) ohne Anfrage umfasst. 30
10. Verfahren nach einem der vorhergehenden Ansprüche, bei dem die Ticketdaten in einem Präsentationsformat zu der Mobilstation (5) übertragen und in einem zweiten, anderen Präsentationsformat von der optischen Lesevorrichtung (6) empfangen werden. 35
11. Verfahren nach einem der vorhergehenden Ansprüche, bei dem die Ticketinformationen eine Transportdienstleistung betreffen. 40
12. Verfahren nach Anspruch 11, bei dem die Ticketdaten von der Mobilstation (5) über die optische Lesevorrichtung (6) an einem Ort empfangen werden, an dem Zugriff auf eine Transportdienstleistung besteht. 45
13. Verfahren nach Anspruch 12, bei dem die Ticketdaten elektronische Ticketinformationen umfassen und das Einchecken am Flughafen den Schritt des Lesens der Ticketdaten von dem Display (9) an der Mobilstation (5) mithilfe der optischen Lesevorrichtung (6) umfasst. 50

14. Verfahren nach Anspruch 12, bei dem die Ticketdaten eine Bordkarte für eine Flugreise definieren.

15. Verfahren nach Anspruch 14, bei dem die weiteren Informationen für den Benutzer eine Sitzplatznummer (54) für die Flugreise enthalten.

Revendications

1. Procédé d'exploitation d'un système de billetterie pour utilisateurs, le procédé comprenant les étapes consistant à :

générer des données de billet qui représentent des informations relatives au billet pour permettre auxdites données de billet d'être utilisées par un utilisateur du système (1, 2, 3) ; et transmettre lesdites données de billet de sorte qu'elles soient reçues par une station mobile (5) par l'intermédiaire d'une liaison de réseau de communications mobiles (4) ; **caractérisé en ce qu'il** comprend les étapes consistant à :

recevoir lesdites données de billet provenant de ladite station mobile (5) par lecture desdites données de billet (53) à partir d'un affichage (9) sur la station mobile (5) au moyen d'un dispositif de lecture optique (6) ; et utiliser lesdites données de billet lues au moyen dudit dispositif de lecture optique (6) lors de la vérification d'une transaction avec ledit utilisateur ;

dans lequel les données de billet sont transmises à ladite station mobile (5) dans un format de message texte comprenant lesdites données de billet et des informations supplémentaires, et les informations supplémentaires (54) sont affichées pour être lues par l'utilisateur.

2. Procédé selon la revendication 1, comprenant en outre les étapes consistant à stocker des données de système correspondant auxdites données relatives au billet dans ledit système (2), et accéder ensuite auxdites données de système (2) lorsque lesdites données de billet sont reçues par ladite station mobile (5) par l'intermédiaire dudit dispositif de lecture optique (6).
3. Procédé selon la revendication 1 ou 2, dans lequel le format de message texte comporte en outre un en-tête qui indique que le message texte contient des informations relatives à la réservation ou au billet.
4. Procédé selon la revendication 3, dans lequel la sta-

- tion mobile (5) contrôle (22) si l'en-tête indique ou non que le message texte contient des informations relatives à la réservation ou au billet et si cela est le cas, stocke (23) le message texte dans un répertoire de messages de réservation distinct d'un répertoire de messages normaux. 5
5. Procédé selon l'une quelconque des revendications précédentes, dans lequel le message texte est un message SMS. 10
6. Procédé selon l'une quelconque des revendications précédentes, dans lequel le dispositif de lecture optique (6) est un lecteur de code à barres ou de code de numéro d'identification personnel (pin). 15
7. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre les étapes consistant à : 20
- stocker le billet après génération dans un dispositif de stockage accessible par l'intermédiaire dudit réseau de communications mobiles (4) ; et transmettre les données de billet par l'intermédiaire de la liaison de réseau de communications mobiles (4) sur demande. 25
8. Procédé selon la revendication 7, dans lequel les données de billet sont transmises à l'utilisateur au moment demandé par l'utilisateur. 30
9. Procédé selon l'une quelconque des revendications 1 à 6, comprenant l'étape consistant à transmettre les données de billet sur la liaison de réseau de communications mobiles (4) sans demande. 35
10. Procédé selon l'une quelconque des revendications précédentes, dans lequel les données de billet sont transmises à ladite station mobile (5) dans un format de présentation ; et reçues par ledit dispositif de lecture optique (6) dans un second format de présentation différent. 40
11. Procédé selon l'une quelconque des revendications précédentes, dans lequel les informations de billet concernent un service de transport. 45
12. Procédé selon la revendication 11, dans lequel les données de billet sont reçues par ladite station mobile (5) par l'intermédiaire dudit dispositif de lecture optique (6) à un emplacement au niveau duquel un accès à un service de transport est prévu. 50
13. Procédé selon la revendication 12, dans lequel lesdites données de billet comprennent des informations relatives au billet électronique et l'enregistrement au niveau d'un aéroport comprend ladite étape de lecture desdites données de billet à partir de l'af- 55
- fichage (9) sur la station mobile (5) au moyen du dispositif de lecture optique (6).
14. Procédé selon la revendication 12, dans lequel lesdites données de billet définissent une carte d'embarquement pour un vol aérien.
15. Procédé selon la revendication 14, dans lequel lesdites informations supplémentaires comportent un numéro de siège (54) pour l'utilisateur sur le vol aérien.

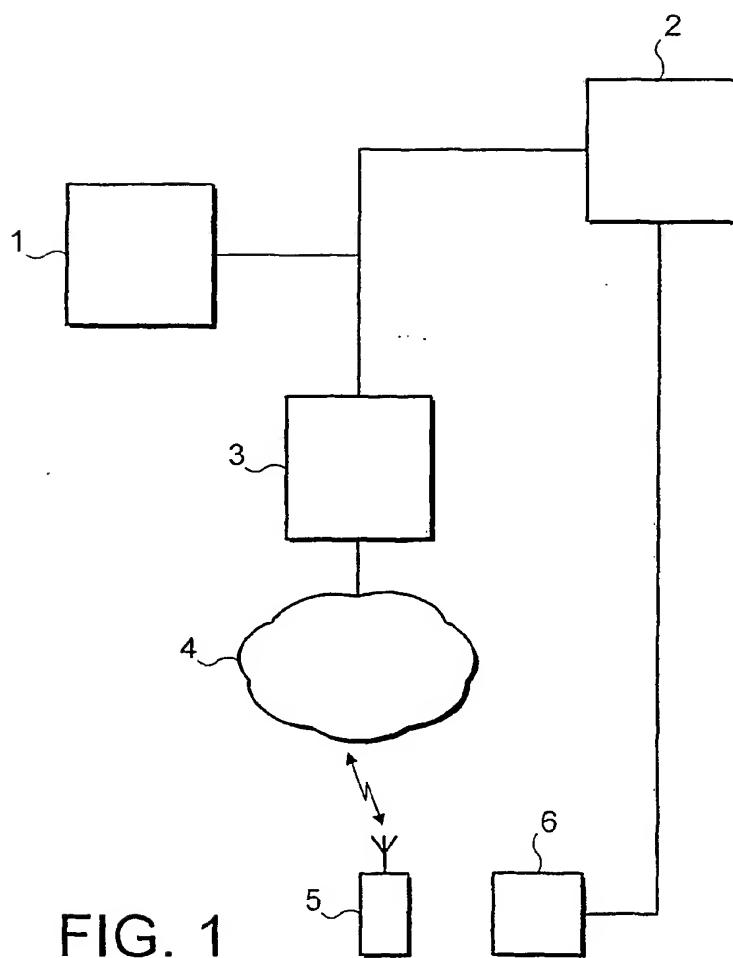


FIG. 1

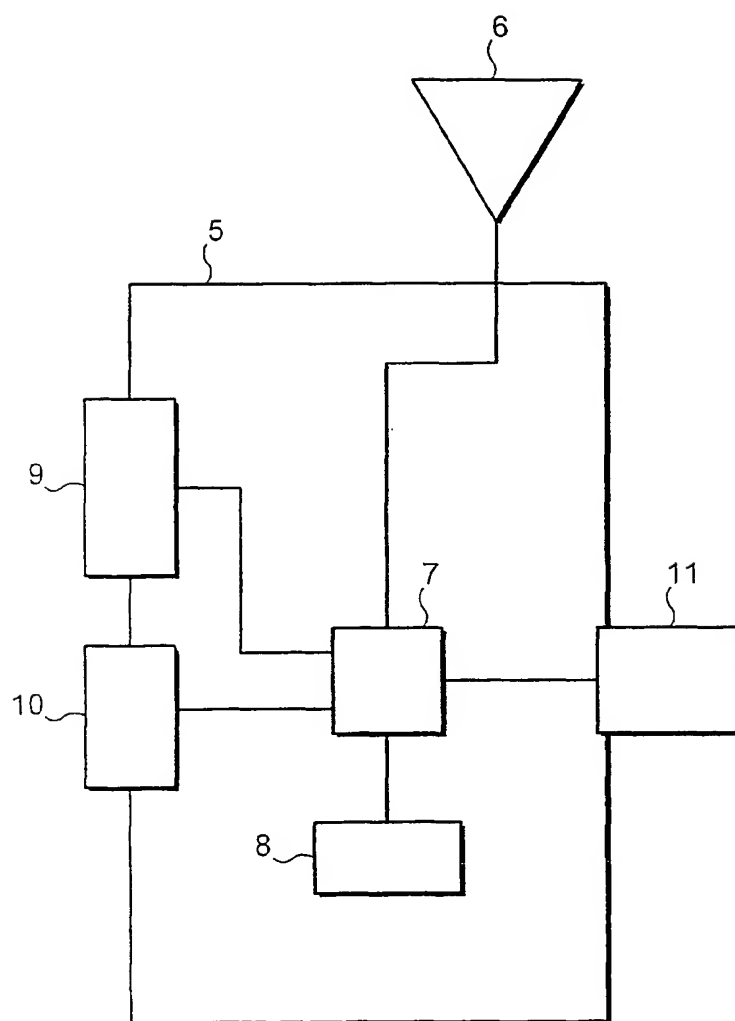


FIG. 2

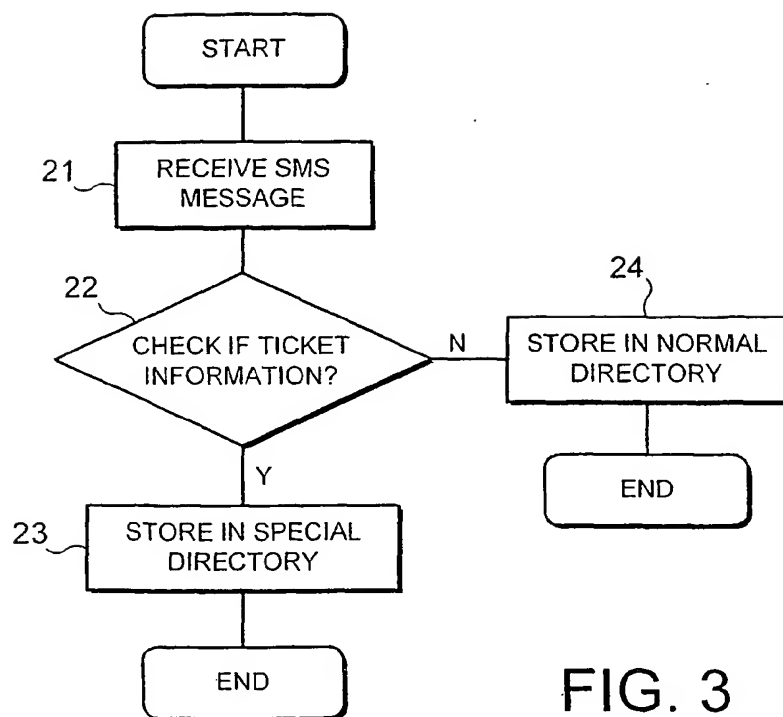


FIG. 3

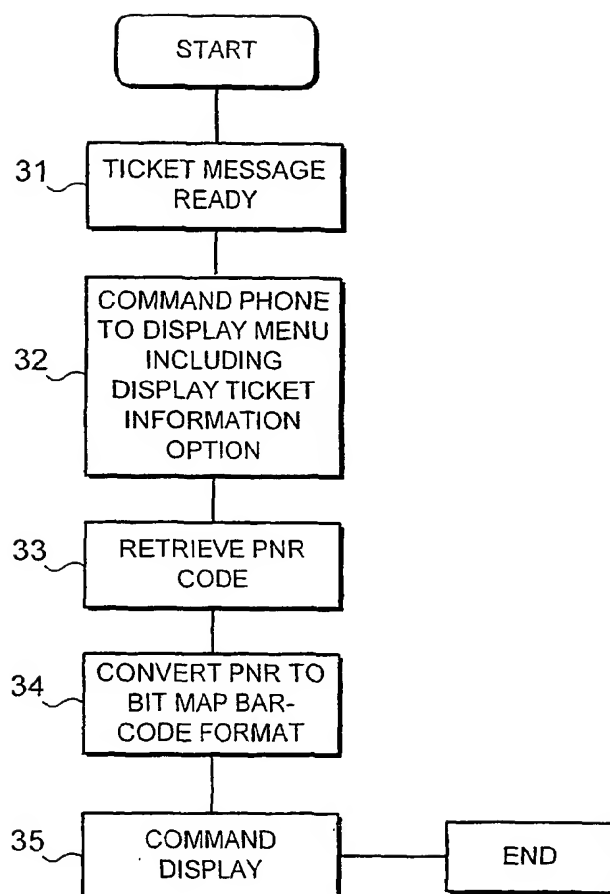


FIG. 4

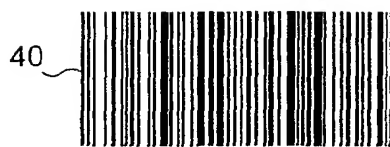


FIG. 5A

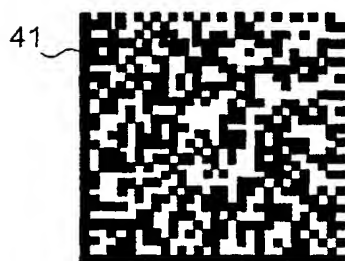


FIG. 5B

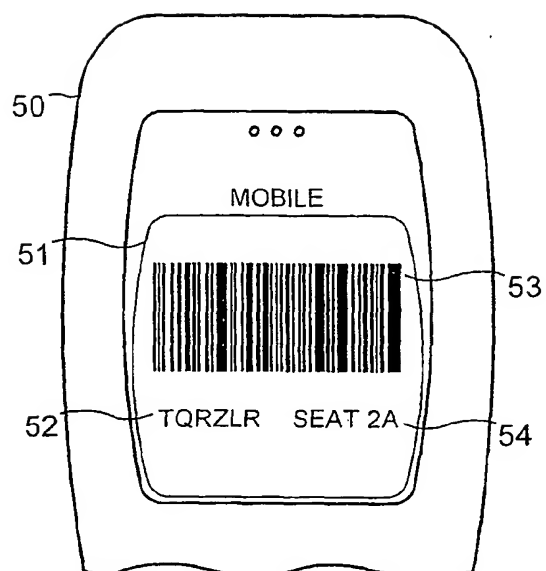


FIG. 6